# SECTION VIII

# UTILIZATION EQUIPMENT

## 8.01 PROTECTION OF SERVICE

A. Hoists, elevators, welding machines, X-ray machines, arc furnaces, compressors and other equipment where the use of electricity is intermittent or the load fluctuates rapidly, shall be installed and used in such manner that they will not adversely affect voltage regulation or impair the Company's service to other customers. The customer shall, prior to completing plans to use such equipment, furnish the Company complete information as to the manufacturer, type, size, voltage, amperage, power factor, harmonic content and other data regarding the equipment's performance under conditions of maximum output, and shall also supply such other information pertaining to the equipment as the Company will require to enable it to determine if adequate service for the equipment is available at the desired location. In all cases the customer must obtain Company approval before using such equipment.

B. Whenever a customer's utilization equipment, other than acceptable equipment described in this section, has characteristics which cause objectionable interference with the Company's service to other customers or to the Company's use of its equipment, the customer shall make changes in such equipment or provide and maintain at his expense the necessary additional equipment to prevent or eliminate such interference; however, where practical, the Company upon request, will furnish in accordance with the provisions for furnishing "Excess Facilities", a separate transformer or other facilities to reduce or eliminate such interference. The Company, however, does not by installing such facilities waive its right, where detrimental conditions from such equipment still exist, to require the customer to install corrective equipment. Unless corrected, the Company will discontinue all service to the Customer.

C. When a customer desires additional Company facilities (such as transformers) to minimize voltage fluctuations on his own electrical circuits or to provide satisfactory operation of his equipment (i.e., welders, induction heating equipment, X-ray machines, computer and/or electronic equipment), such facilities, where practical, will be furnished by the Company in accordance with the provisions for furnishing "Excess Facilities".

D. The Company reserves the right to inspect and test any equipment connected to its lines to determine its operating characteristics and to require that such equipment be provided with name plates showing the voltage, phase, power factor, harmonic content, full-load and/or locked rotor amperes, operating amperes and/or kilovolt ampere requirements.

E. When a customer installs capacitors on his electrical facilities to improve the power factor of his installation, the customer shall provide, at the request of the Company, in order to avoid abnormal voltages or damage to Company's facilities, a means of automatically disconnecting any or all of the capacitors when the equipment causing the low power factor is not operating.

F. High frequency equipment, such as automatic heating equipment, spark discharge devices, radio transmitting equipment, etc., shall be designed and operated in such a manner as to prevent the presence of high frequency or other disturbances on the Company's electrical system.

**8.02 LOAD BALANCE**

The customer's 120 volt load on 120/240 volts circuits and single-phase load on three-phase circuits shall be so connected that a minimum of unbalanced current occurs on the Company's facilities.

**8.03 SINGLE PHASE SERVICE**

A. In general, miscellaneous single-phase equipment, except motors, may be connected at 120 volts, if the equipment does not have a rated capacity in excess of 2 kilowatts or 2 kilovolt amperes. When the rating of any single piece of equipment exceeds 2 kilowatts or 2 kilovolt amperes, it shall be connected at 240 volts. (For motors, see Paragraph 8.05).

B. All flasher signals or signs which require more than one supply circuit shall be connected for 3-wire, 120/240 volts, and the load shall be balanced throughout each portion of the flasher signal.

## 8.04 VOLTAGE FLUCTUATION

A. Starting of motors can produce voltage fluctuations resulting in objectionable flicker on lighting equipment which is supplied by the same circuits. Through industry standardization, motor starting currents of generally used domestic appliances have been established at values which will not cause objectionable flicker under normal conditions.

B. Starting of large three-phase motors requires special consideration of the power supply and wiring. The Company is prepared to assist the customer in planning these installations. In every case the Company must be notified so that adequacy of the service facilities may be determined and changes may be made, if necessary.

## 8.05 SINGLE PHASE MOTORS

A. All single-phase motors with ratings of 1/2 H.P. and larger should be connected for supply at 240 volts whenever it is practical in order to minimize voltage fluctuation in the wiring system. Where service is available from a 208Y/120 volts system, the single-phase motors should be connected for supply at 208 volts.

B. Whenever a starting current causes undue interference with service to other customers, the customer shall provide a starting device, of a type which will reduce the starting current to the value required to eliminate such interference: otherwise, it may be necessary to take service from a separate transformer as provided in Paragraph 8.01.C.

C. Motor installations for air conditioning equipment, farm applications and heat pumps in ratings of 1/2 to 7 1/2 H.P. should be of the capacitor-start, capacitor-run design.

D. When equipment has more than one motor with a common control, the combined instantaneous starting currents of all motors starting simultaneously shall not exceed the Company's Voltage Fluctuation Standards.

E. Overload protection must be provided for all motor circuits in accordance with the *National Electrical Code* requirements.

## 8.06 THREE PHASE MOTORS

A. The Company shall be notified of each installation of 7 1/2 H.P. or more, or whenever a proposed installation will increase the customer's connected load by 20% or more.

B. Prior to purchasing or installing any three phase motors, it is advisable that the Company be notified to assure the character and adequacy of the supply facilities.

C. Customers having three-phase service may install three-phase motors of 7 1/2 H.P. or less with across-the-line starting. It may be necessary that three-phase motors of greater than 7 1/2 H.P. be installed with starting devices that will reduce the starting current to limits established by the Company for the conditions of that particular location.

## 8.07 PROTECTIVE DEVICES

A. The customer's equipment must be equipped with overload devices which conform to the *National Electrical Code*.

B. Under-voltage-release starting equipment is required on all motors of 7 1/2 H.P. and larger and on all motors that cannot be safely subjected to full-voltage starting. The under-voltage release shall be of a type that will return the starting device to the "off" position when the electric supply is interrupted. Under certain conditions, time-delay under-voltage release starting equipment will be permitted.

C. Any three-phase motor that is installed to operate elevators, cranes or other apparatus which would cause damage due to a reversal of motor rotation shall be equipped with reverse-phase relays designed to disconnect the motor from the line in case it should receive single-phase or reverse-phase power. In addition, mechanical devices shall be installed to prevent damage due to travel of the driven mechanism in the wrong direction. The Company assumes no liability for damage resulting from single-phase or reverse-phase operation of three-phase equipment.

## 8.08 TRANSFORMERS

When a customer desires 120 volts for lighting or small appliance use from a four-wire, three-phase 480Y/277 volt supply, autotransformers may be provided and installed by the customer if a grounded conductor on the supply side is solidly connected to a grounded conductor on the secondary side of the transformer. In all other cases, the transformers for such use shall have separate primary and secondary windings with appropriate ground-connections on the secondary windings.

## 8.09 FURNACES, OVENS, WELDERS, AND VARIABLE SPEED MOTOR CONTROLS

The customer shall secure information from the Company pertaining to the availability of service for all electric furnaces, welders, ovens and variable speed motor control devices prior to completing plans or purchasing such equipment.